New views on old hands: the context of stencils in the cave art of El Castillo and La Garma (Cantabria, Spain).

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Introduction

Hand stencils and prints form one of the most recognisable categories of European Palaeolithic 'cave art'. Since their initial study by Cartailhac (1906-9), Capitan (1911) and Breuil (e.g. Alcalde del Rio et al. 1911; Breuil 1952) research into their nature and meaning, particularly over the last half century, has been in an interpretative stasis, with a voluminous literature essentially repeating questions as to what the age and gender of the stencilled individuals were and why some fingers or extremities of them appear to be missing (or bent). We take here a contextual approach to the production and location of hand stencils in the caves of El Castillo and La Garma in Cantabria (henceforth 'stencils' – which are far more numerous than positive prints) as they are in relatively close proximity and contain a relatively large number of stencils. Our rationale is that while we may not be able to answer questions about gender and attenuated fingers with any degree of confidence, we can look

past these questions and reformulate our approach around their context in the caves and the ease or difficulty underlying their production. What follows therefore is the first detailed examination of the physical context of stencils. The resulting interpretations are preliminary, but reveal the validity of a new concept – palpation – that may prove valuable for understanding cave art more widely.

Background: hand stencils in Palaeolithic cave art

In many societies, both contemporary and in the ethnographic and historical past, the hand serves as a cultural icon, and the positions and symbolic opposition of the left and right hands have come to be imbued with strong cultural messages. Even though modern *Homo sapiens* societies tend to prioritise spoken language above hand-based communication, enough use is made of hand-based systems of communication by small-scale societies to suggest that this has a considerable antiquity, and thus it may have played an important role to Palaeolithic hominins capable of creating and understanding symbolic systems (e.g. Capitan 1911. Leroi-Gourhan 1967). Examples of hand *stencils* (outlines created by projecting fluid pigment over a hand placed against a cave surface) and hand *prints* (made by pressing a pigment-covered hand against a surface) are found in a variety of countries, periods and cultural contexts, such as, for example, Argentina, Australia, Borneo, Mexico, Peru, the Sahara and the USA (Arizona and California), all apparently of Late Pleistocene or younger age. European Upper Palaeolithic examples – which form the focus of this study - are known in a number of caves in France and Spain. No precise quantification of the number of stencils/prints and the number of caves known to contain them is known to the authors: we count them in 42 caves[3], of which 29 are in France and 13 in Spain. Among

[3] France: Abri du Poisson; Bara-Bahau; Baume-Latrone; Bayol; Bédeilhac. Bernifal; Grotte du Bison; Bourgnetou; Chauvet; Cheval;Les Combarelles; Cosquer; Cougnac;Ebbou; Erberua; Les Fieux; Font de Gaume; Les Garennes; Gargas; Grand Grotte at Arcy-sur-Cure; Labattut; Moulin de Laguenay; Les Merveilles (Rocamadour); Pech Merle; Le Portel; Roucadour; Tibiran; Trois-Fréres; Roc de Vezac. Spain: Altamira; Ardales; El Castillo; Cudón; Fuente del Salin; Fuente del Trucho; La Garma; La Lastrilla; Maltravieso; Oxocelhaya; La Pasiega; El Pindal; Tito Bustillo. We exclude prints in clay. (e.g. Breuil 1952. Leroi-Gourhan 1968. Pradel 1975. Delluc and Delluc 1991. Ripoll López 1999a. Delluc and Delluc 1991. Barrière and Sueres 1993. Lorblanchet

these the greater majority are in southern France (Dordogne, Lot, Ariège) and northern Spain (Cantabria) although isolated examples are known as far north as the Grand Grotte at Arcy-sur-Cure, Burgundy (Baffier and Girard 2007) and south as Ardales near Malaga (Espejo Herrerías and Cantallejo Duarte 2006).

Breuil (1952, 38) assigned prints and stencils to his Aurignacian-Perigordian cycle on the basis of their preceding stratigraphically "all other paintings" and their apparent lack of association with anything other than "rare spots, lines of discs in series, and sometimes timid attempts at line drawing." Although Leroi-Gourhan occasionally assigned them to a later phase (e.g. his Style III/Solutrean-Early Magdalenian for Tibiran; 1968, 321) Breuil's view clearly prevailed and they have come to be seen as Gravettian by most subsequent researchers (e.g. Barrière and Sueres 1993, 49; Clottes 2008. Clottes and Courtin 1996, 166-7; Foucher et al. 2007, 83; Lawson 2012, 318; Lorblanchet 1995, 245-6; Ripoll López et al. 1999, 13; Von Petzinger and Nowell 2010. White 1993, 69). In no published case, however, is it clear why an *earlier* age has been ruled out. Sahly (1966, 276) viewed them as Aurignacian although did not explain why; a broader Aurignacian/Gravettian age was suggested by Bernaldo de Quirós and Cabrera (1994, 268) and by Lorblanchet (2007, 211), views which seem to be echoed by von Petzinger and Nowell (2011, 1178-80) in their critique of stylistic dating of cave art. Clottes and Lewis-Williams (1998, 45) also suggest this age, although are contradicted by Clottes and Courtin (1996, 167) and Clottes (1998,114-5) who thought the *oldest* examples were of Gravettian age. Snow (1996) recognised that some might be older than the Gravettian; Davidson (1997, 148) assumed that they are the "earliest figures in Upper Palaeolithic cave art" although referred to the stencils of Cosquer Cave as Gravettian; and Gárate (2008, 24) saw them as part of a set of human themes including human outlines and vulvae which was "significant until the Solutrean". Bahn and Vertut (1988, 135) saw the issue as open, noting that they may span the entirety of the Upper Palaeolithic on the basis of the lack of evidence to the contrary.

1995. Clottes and Courtin 1996. Ripoll López et al. 1999a. González Sainz 2003. Guthrie 2005. Espejo Herrerías and Cantallejo Duarte 2006. Baffier and Girard 2007. Foucher and Rumeau 2007. Henry-Gambier 2007. Mélard et al. 2010. Von Petzinger and Nowell 2011.

Independent verification of the age of stencils/prints in the form of absolute dates is rare. Ucko and Rosenfeld (1967, 67) were critical of a supposed stencil on a block recovered from between two Perigordian levels in the Labattut rockshelter (Dordogne), although its context is well recorded and the stencil is clear on a photo published by Delluc and Delluc (1991). It can be taken as a clear indication that the fragment of cave wall/ceiling on which the stencil was created fell during the Gravettian, which provides a minimum age for the creation of the stencil itself. This is perhaps not surprising given the general similarity of the Labattut art with Aurignacian rock art from shelters in the vicinity (J. Zilhão pers. comm. and cf. Delluc and Delluc 1991); it could be Gravettian, it may well be older. AMS radiocarbon measurements that are usually cited as chronological evidence of the antiquity of stencils are not without problems. A measurement of 22,340 +510/-480 BP from Fuente del Salin (Moure Romanillo and González Morales 1992) actually measures charcoal from a hearth close to the stencil of interest; and a measurement of 26,860 ± 460 BP from Gargas is actually on a bone splinter wedged into a crack near the Great Panel of Hands (Foucher and Rumeau 2007, 83). These are not clear associations, and while they demonstrate close to the location of stencils the burning of a hearth and the insertion into a crack of the bone of an animal that died during the Gravettian (although the insertion could of course have occurred later), and are thus not inconsistent with Gravettian ages for them, they are not necessarily relevant to the stencils' age. The same caution must be applied to the hand stencil found several metres from human remains radiocarbon dated to 27,010 ± 210 BP and 26,690 ± 190 BP in Les Garennes cave, Vilhonneur, France (Henry-Gambier et al. 2007). Perhaps a little clearer is the measurement of 24,640 ± 490 BP on one of the two dappled horses of Pech Merle, which do appear to be meaningfully associated with six hand stencils in this complex panel (Lorblanchet 1995). A fairly clear association is the radiocarbon measurement of 26,770 ± 380 BP (Lyon-3361 Poz) on charcoal from a hearth in a thin horizon directly atop bedrock containing fragments of spalled roof on which pigments are visible, immediately below several ceiling stencils in Le Moulin de Laguenay cave, Corrèze (Mélard et al. 2010). To our knowledge, however, the only AMS ^{14}C measurements *directly* on a stencil are the two of 27,110 ± 350 BP (Gif A 92491) and 27,110 ± 190 BP (Gif A 92409)

on the same stencil in the Grotte Cosquer (Clottes et al. 1992). Both the Pech Merle and Cosquer examples were measured two decades ago, prior to current (ABOx) pretreatment methods for charcoal, however, and for this reason some specialists would presumably view these as minimum ages (Higham 2011). Recent U-series dating of stalagmites overlying two stencils in El Castillo has provided clearer indications of their minimum ages, in this case of ~24,000 and ~37,000 (cal) BP (Pike et al. 2012). These new results provide independent verification of the early age of stencils as suspected by Breuil, and in the case of the oldest measurement clearly a pre-Gravettian cultural context. Overall, the reliable chronometric data available at present are consistent with the notion that stencils and prints belong to an early, largely non-figurative phase of cave art, prior to a subsequent rise to dominance of animal figures that began in the Gravettian and culminated in the Magdalenian (Ripoll López et al. 1999, 73. Gárate 2008). Further support for this notion derives from pigment analysis of the art of La Garma, discussed below, which links the stencils to other non-figurative art but not to the cave's figurative art of Middle Magdalenian age. If the early age of stencils is borne out by further analyses it may be of interpretive importance, given that they fall into a conceptual space between non-figurative and figurative art, and it may be no coincidence that their creation forms an *outline* (of a hand) in the same period as simple animal outlines were emerging in parietal art. For the purposes of this paper, however, the only assumption one needs to make is that the stencils in each cave are broadly contemporary and thus can be interpreted as a thematic group.

In only a few cases have stencils been meticulously studied and published, notably at Gargas (Barrière and Sueres 1993. Sahly 1966. Foucher and Rumeau 2007), Cosquer (Clottes et al. 1992; Clottes and Courtin 1996, 69-79) and Maltravieso (Ripoll López et al. 1999a, b). Wider research has concentrated entirely on the *identity* of hand stencils rather than their context, i.e. the possible gender and age of the people whose hands were depicted, whether left or right hands were depicted (e.g. Faurie and Raymond 2004), and why in some caves fingers or parts of them appear attenuated, i.e. missing or bent back (in the last half century, for example, Janssens 1957. Sahly 1966. Leroi-Gourhan 1967. Hooper 1980. Wildgoose et al. 1982. Barrière and Sueres 1993. Ripoll López et al. 1999. Guthrie 2005, 114-32. Gunn 2006.

Rouillon 2006. Snow 2006. Steele and Uomini 2009). Most researchers agree that the left hand was overwhelmingly stencilled; that finger ratios and lengths are often consistent with female hands, and that there is no reason to assume more than a small number of individuals are represented in each cave. There is less consensus about the meaning of attenuated fingers; what are usually described as 'Missing' fingers, in fact, belong to stencils in only a small number of the caves, yet the focus on these presumably resulted simply from their abundance in Gargas and neighbouring Tibiran. Given the relative rarity of attenuated fingers (a term we favour due to its neutrality) among this relatively rare category of parietal art one really should not be preoccupied with it.

New research in La Garma and El Castillo

We have undertaken an informed analysis of the context and positioning of stencils in La Garma and El Castillo, notably whether stencils were associated with particular morphologies of or features on the cave surfaces; whether the creation of stencils in any way related to the wider 'experience' of the cave, e.g. the tactile exploration of it; and whether ease/difficulty of their production was a factor. In order to address these questions we took a number of observations and measurements of each visible hand stencil. We did not focus solely on the stencils in isolation (i.e. their morphology), but sought to understand their overall context. By taking this holistic approach we hope that we will widen our understanding of stencils and by so doing widen the appreciation of 'cave art' through exploring objectively processes of individual decision-making made in a very specific and constrained environment. Given that the stencils appear to be relatively early in the chronology of Palaeolithic art we hope that this new perspective will contribute to current debates as to the origins and development of cognitively 'modern' behaviour and art in general.

El Castillo, in the village of Puente Viesgo, and La Garma, just north of the village of Omoño, lie ~29km apart, to the southwest and east of Santander respectively (Figure 1). The ~300m

long cave of El Castillo can be divided into two areas; a large entrance chamber (the Gran Sala), and a subsequent labyrinth of narrow galleries totalling almost 1km in length. Much of its art is figurative and can be attributed to the Solutrean or the Magdalenian, although its hand stencils belong to an earlier group which includes dots and lines, the antiquity of which was recently attested by the U-series dating noted above (Pike et al. 2012). Most of the stencils – probably at least 44 of which 38 are clear - cluster in a panel in a narrow gallery beyond the Gran Sala –the Gallery of the Hands – although isolated examples exist further into the cave's depth (Alcalde del Rio et al. 1911. Leroi-Gourhan 1968, 333-4: Figure 2) and as many surviving examples are feint one cannot rule out that their absence from the Gran Sala is due to their disappearance due to atmospheric erosion as noted by Alcalde del Rio et al. (1911, 117). The ~300m long Lower Gallery of La Garma cave, 12km from Santander, can be divided into nine zones on the basis of the cave's topography. Contrasting patterns of spatial distribution distinguish the early (Pre-Magdalenian) and late (Middle Magdalenian) stages of Palaeolithic activity so far identified in the cave (Arias et al. 2011. Ontañón 2003. González-Sainz 2003). The former stage (including the stencils, series of red dots and other simple paintings, as well as animal representations also in red) occur along the entire gallery; the later stage (comprising the remains of habitation structures and numerous paintings and engravings of Magdalenian style) is concentrated in the areas that are close to the cave's original entrance (zones I-IV, spanning roughly one third of the gallery's length). Recent pigment analyses of a number of examples of the cave's art has reinforced this division, demonstrating that the hand stencils are linked to non-figurative dots and lines rather than to the more diverse figurative images of the Magdalenian (Arias et al. 2011).

In the present study we examined as many hand stencils as were clearly visible in La Garma (N=27) and El Castillo (N=38) (Figure 3). A series of observations on each specific hand stencil and its surroundings/associations were taken. These were: colour (in both caves always red); left or right hand (assuming a palm down position); the length (mm) of each observable digit; the width of palm (mm); the orientation of the hand (expressed as a point in a 360° circle); the angle between the thumb and the index finger; and the height above the cave floor. In addition to these we recorded contextual information about the *location*

and *associations* of each hand stencil, specifically: the type of surface (e.g. flat, smooth, modified, bright, dull); the presence/absence of specific features (notably stalactite, concave or convex surface, cracks) and relation of these to the stencil; any artistic association (i.e. whether other stencils or other art is located close by); the wider positioning of the stencils (i.e. chamber type, proximity to shafts, stalactite columns and other features); the specific position of stencils in relation to localised cave wall morphology, e.g. 'convex or concave surfaces, cracks and the like. In this paper we concentrate on these contextual associations.

Stencilling: comfort and practicality

In order to develop an heuristic system of use to interpreting our observations in El Castillo and La Garma, a number of project members and students replicated stencils. In this way we established the necessary position of the stencilled individual and the degree of difficulty this position entailed assuming the stencilled was also the stenciller. We created numerous hand stencils at 10° intervals at head, above-head, and knee heights, grading the comfort and practicality of creating each stencil on a scale of 1) (comfortable/practical) to 5 (very uncomfortable/very difficult). Results were averaged in order to establish a coded system of difficulty for every 10° of position. The angle of each stencil in El Castillo and La Garma was then established (excluding a small number executed on ceilings for which an orientation is unclear), and the comfort and practicality of creating each was elucidated. This confirmed that the most comfortable position in which to produce stencils was at 45° to the left (of vertical) when producing a stencil of the right hand, and 45° to the right (of vertical) when producing a stencil of left hand. We then compared this with the orientation of stencils in La Garma and El Castillo (Table 1). Perhaps not surprisingly, 95% of stencils in La Garma and 85.6% in El Castillo were created within the most practical and comfortable range of 45° (left) to 135° (right), but in each cave a small number of exceptions exist (one in La Garma and five in El Castillo), which were created in uncomfortable and impractical conditions even though more comfortable and practical locations were available to their immediate vicinity

(e.g. flat surfaces around head height). It is probable no coincidence that in four out of these five cases the stencils seem to be associated with features of the cave walls, to which we return below. From this one can infer that choices about the placement of stencils were not simply about practicality; some were created at chosen locations irrespective of whether they were comfortable and practical or not. Clearly, other factors determined their position on occasion. Some examples are extreme: Hand 28 at the extreme right of the Main Panel of Hands in El Castillo – which is the only example of an uncomfortable/impractical stencil without any obvious association to a feature of the cave wall - was created at a low height on a steeply sloping flowstone surface close to where it meets the cave wall. This is a remarkably uncomfortable and impractical position to assume, strongly suggesting that a second individual created the stencil, i.e. that stenciller and stencilled were separate individuals (Figure 4).

Stencils: context and associations

In previous research little attention has been paid to the context of stencils. What information has been published is typically informal, with formal associations generally restricted to those with other examples of cave art, which may or may not be contemporary. Leroi-Gourhan (1968, 148), for example, noted an associated between hand stencils and rows or clusters of dots and parallel strokes in Gargas, Les Merveilles (Rocamadour), Pech Merle, El Castillo and Bernifal, and their proximity to /location in the midst of “central compositions” in Bayol, El Castillo, Pech Merle and Bernifal, interpreting them in terms of his gendered symbolism, although it is probable that he was grouping art of different ages into this holistic view and thus that these are not meaningful associations. Otherwise, published associations with the topography of cave surfaces are few. Lewis-Williams (2002, 219) noted a ‘bulging’ of the rock face between two hand stencils of the dappled horses panel in Pech Merle, and in the Grotte Cosquer eight stencils cluster on a stalagmite drapery and another was placed in a natural niche (Clottes et al. 1992 figures 6 and 7 respectively). Thus while it is obvious from published photographs that stencils could

be placed in or above niches (.e.g. in Gargas [Foucher et al.et al. 2007, 41, figure 37; Foucher and Rumeau 2007, figures 49, 52, 67, 68] and Cosquer [Clottes and Courtin 1996, figure 35, page 71]), in proximity to cracks (e.g. in Gargas [Bourges 2007,figure 31] and in Cosquer [Clottes and Courtin 1996, figures, 33, 171), and atop stalactite draperies (e.g.in Cosquer [Clottes and Courtin 1996, figures 31 and 38]) no systematic study has to our knowledge been undertaken.

Table 2 presents hand stencils in El Castillo and La Garma that are found in obvious association with natural features, notably fissures, convex bosses and concave depressions, observed examples of which are defined in the table. In total 80% of observable stencils at La Garma and 74% at El Castillo have some kind of association, either with fissures or undulations on the caves' surfaces. As areas of 'smooth' rock were easily accessible in each cave and within close proximity to stencils such associations cannot be entirely fortuitous. Some stencils seem to have been 'fitted' to subtle topographic features in the wall, and some were positioned on bosses in the wall in such a manner that they appear to be 'gripping' the wall in a similar way that cave explorers use their hands to steady themselves when navigating the caves (Figure 5).

From Table 2 it can be seen that a concern with 'gripping' convex rock surfaces is observable on ~27% of stencils in La Garma and ~23% in El Castillo. The palms of a smaller number of stencils – 17% and 5% respectively – have been 'ergonomically' fitted to slight concavities on the cave surfaces. Even using modern lighting these can only be seen very close up, and under the lighting conditions under which they would have been created, such fitting would have necessarily involved touch as well as very close-up visual examination of the surface. Overall there seems to have been more of a concern with fitting stencils to surface morphology in La Garma (44% have either gripping or ergonomic characters) than El Castillo (28%). By contrast, an association with natural cracks or fissures typically accounts for 39% of stencils in La Garma and 60% in El Castillo. Details differ between the two: in La Garma the concern is more with placing the stencil to the right of fissures (15%) or in between two fissures (9%), whereas in clear contrast a concern with placing stencils directly on top of fissures (29%) or with two stencils spanning fissures (11%) is clear at El Castillo. It is of

interest that the few examples of stencils placed in uncomfortable and impractical positions (with coded scores of 4 or 5 in each category) possess clear associations: in El Castillo these are Hand 7 (placed atop a stalactite), Hand 13 (associated with a crack), and the apparently associated Hand 35 (placed in a chimney accessed only up a steep slope) and Hand 36 (ergonomically fitted to a palmar concavity, with fingers gripping a boss).

Specific examples illustrate our observations. Six stencils comprise El Castillo Area 1, among which one was created from a comfortable position on a relatively flat surface atop several fissures, despite the 'availability' of unfissured rock nearby (Figure 6). In the Main Panel of Hands (our Area 3) one stencil was created over a small concave depression, and thus was ergonomically placed (Figure 7). An isolated hand in the Gallery of Dots was similarly ergonomically fitted to an otherwise smooth surface, the palm placed over a slight concave depression and the fingers 'gripping' a boss in the wall next to a natural fissure (our 'ergonomic;, 'gripping' and 'right of fissure' positions) (Figure 8). In the Main Panel two stencils of a left hand (probably the same hand) were created in very close proximity to each other to either side of a natural crack (Figure 9). A more obvious pairing, again 'spanning' a crack, was created by left and right hands placed on an otherwise smooth surface (Figure 10). The height of these stencils – directly above the head of the stenciller/stencilled, would have rendered them difficult to create whatever the specific method.

By comparing these associations with the specific morphologies of the relevant hand stencils we hoped to establish a pattern of individual choice in the placing of the stencils. In most cases stencils were too feint to establish finger lengths and other measurements confidently. Where stencils are clear finger terminations may still be vague and thus decisions about where to begin and end measurements probably involve an error in the order of a few millimetres; thus we are cautious not to over-interpret these results and accept that the little data we do have may underestimate the actual number of individuals who left stencils of their hands in the caves. Table 3 documents finger and palm measurements for stencils with the most common associations in the two caves. At La Garma, the morphology of stencils in the gripping position seems to reflect four separate individuals, the index/ring finger ratios (*sensu* Snow 2006) of two consistent with females

(Hands 16 and 24) and one with a male (Hand 23). At least two individuals placed stencils to the right of fissures based on the length of their middle fingers (Hands 14 and 16, the small length of the former possibly indicative of a juvenile). Hand 16 was placed with the fingers in the gripping position, the palm ergonomically fitted and to the right of a fissure. At least two individuals placed stencils in positions bordered by fissures (Hands 15 and 23 and 24 which may belong to the same individual and are consistent with a male). At least three individuals left stencils with no association visible today (Hands 2, 5 and 13).

In El Castillo it is possible that Hands 4 and 6 in the gripping position were left by the same individual, although two other individuals seems to have adopted this position too (Hands 32 and 38, the latter of which has finger ratios consistent with a female). Little can be said for stencils placed atop fissures except that three individuals seem to be represented by Hands 1, 6 and 18, the finger ratios of the latter consistent with a male. Three individuals placed stencils spanning fissures (Hands 12, 19 and 20, the latter of which is consistent with a female). This is of interest, as Hands 19 and 20 form a left and right pair that otherwise one would assume to represent the same individual, but the morphology suggests that one person placed their left hand to the left of the fissure and a second individual placed their right hand to the right of the fissure. Given the distinct differences in ring, index and little finger lengths of these stencils it is unlikely that these differences reflect measurement imprecision. Three or four individuals left stencils with no association (Hands 15, 27 and 28 which may be the same individual, and 31) and of these the finger ratios of Hand 28 are consistent with a female.

Given the indistinct nature of most stencils one should not make much of these data. It is of interest that few examples exist of the same individual's represented in different areas, but this may well be masked by the indistinctiveness of most examples. What it *does* reveal, at least, is that several individuals were making similar decisions about the meaningful placement of stencils; it is not the work of one individual, but represents similar decision making among a group.

Palpation: a new way of understanding hand stencils

Under the best of lighting conditions the exploration of caves is a very tactile process, during which hands may often be placed on floors, slopes and walls to steady the body. In the extremely low light conditions that pertained for the stencillers they would by necessity be brought into very close proximity with any surface they intended to mark. Hands would be placed on surfaces, fingers and palms traced across them, and the undulations of the cave walls and ceilings 'read' as much by touch as visual inspection. Presumably, we will never know exactly why decisions were made to mark walls with pigments or engravings, although we have identified here a plausible link between touch and marking. In order to fix stencils, red pigments were presumably selected for their visual 'warmth', that is to say their visibility in low light conditions (Groenen 1997). The use of cave topographies and shadows to place and structure figurative art is well known (e.g. Vialou 2001. Lejeune 2001. Pigeaud 2001. Remacle 2004), and our results suggest that similar processes were at work in the creation of stencils, irrespective of whether the process was easy or difficult. To an extent these are of course visual processes, but stencils in gripping positions and particularly with palms fitted to very slight concavities indicate that visual stimuli were not the only way that stencillers interacted with cave surfaces. These reveal that a close-up scrutiny of cave surfaces must have preceded the creation of stencils in the majority of cases in La Garma and El Castillo. For this, we suggest the term *palpation,* deriving from the surgical term for examination by touch. Not that palpation governed only the production of hand stencils; finger dots and lines connect the artist's hands with the cave wall, and finger flutings -that appear to have been created irrespective of discomfort (Sharpe and Van Gelder 2006) - could be interpreted as the visible record of the act of palpation. Furthermore, Lorblanchet (2009) has noted the gradation between bear claw marks and finger 'rubbings' and traces in the caves of the Quercy, which he interprets as a ritual interaction with the cave walls. We have, so to speak, barely scratched the surface here, but hope that we have demonstrated the heuristic potential of examining touch and context in Palaeolithic art. Far more formal examination of the context of parietal art is necessary, as is the investigation of levels of

illumination and its effects on visibility, topography and placement of art. There is clearly much more to 'cave art' than meets the eye.

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Orientation of stencil[1]	**Number (percentage of total) of stencils La Garma (N=21)**	**Number (percentage of total) of stencils El Castillo (N=37)**	**Comfort[2]**	**Practicality[3]**
10°		1 (2.7%)	4	4
45 - 145°	20 (95%)	32 (86.5%)	1	1
150°		1 (2.7%)	2	1
170°	1 (5%)		3	2
190°		1 (2.7%)	4	3
200°		1 (2.7%)	4	4
280°		1 (2.7%)	5	5

Table 1. Orientation, practicality, and comfort levels of stencils at La Garma and El Castillo.

[1]from an angle of 0° which is horizontal and pointing towards the left (9 o'clock on the clock face)

[2]levels defined from experimental work: 1=very comfortable; 5=very uncomfortable

[3]levels defined from experimental work: 1=very comfortable; 5=very uncomfortable

Category of association	**La Garma hand stencils (recorded by our stencil numbers). (N=29 includes 2 thumb stencils)**	**El Castillo hand stencils (recorded by our stencil numbers). (N=38)**	**Percentage of recorded stencils by site (rounded up/down)**
No observable associations	6 (stencils 2; 3; 5; 11; 13; 19)	10 (stencils 15; 17; 21; 22; 23; 25; 27; 28; 31; 34)	La Garma 20% El Castillo 26%
Ergonomic: the stencil is matched to undulations/curves of wall (typically the palm is placed over a minor concave depression).	5 (stencils 1; 9; 16; 18; 26)	2 (Stencils 26; 37)	La Garma 17% El Castillo 5%
Gripping: the fingers of a stencil placed over ('grip') a convex boss or ridge.	6 plus 2 thumbs (Stencils 6; 10; 16; 23; 24; 27; thumb 1; thumb 2)	9 (Stencils 3; 4; 5; 6; 8; 32; 35; 36; 38)	La Garma 27% (includes 2 thumbs) El Castillo 23%
Below fissure: the stencil is located below a natural fissure/crack when viewed upright (i.e. fingers to top).	1 (Stencil 9)	0	La Garma 3%
Bordered by fissures: the stencil is located between two natural fissures/cracks, i.e. to its left and right.	3 (stencils 15; 23; 24)	1 (Stencil 24)	La Garma 9% El Castillo 3%
Within multiple fissures: the stencil is in close proximity to multiple natural fissures/cracks (>2).	2 (stencils 4; 17)	3 (Stencils 9; 13; 14)	La Garma 6% El Castillo 8%
Above fissure: the stencil is located above a natural fissure/crack when viewed vertically.	1 (Stencil 20)	1 (Stencil 32)	La Garma 3% El Castillo 3%
Atop fissure/s: the stencil is placed directly on top of fissure/fissures.	1 (Stencil 25)	11 (Stencils 1; 2; 3; 5; 6; 9; 10; 16; 18; 29; 33)	La Garma 3% El Castillo 29%

Atop stalactite: the stencil is placed on top of a stalactite (flowstone).	0	1 (Stencil 7)	El Castillo 3%
Spanning fissure: a pair of stencils spans a natural fissure/crack, i.e. one to either side.	0	4 (Stencils 11 & 12; 19 & 20)	El Castillo 11%

Table 2. The context and association of stencils at El Castillo and La Garma with natural features of the cave surfaces.

	Thumb (mm)	Index (mm)	Middle (mm)	Ring (mm)	Little (mm)	Angle between thumb & index	Palm width (mm)
La Garma							
No association							
Hand 2	Indistinct	70	Indistinct	70	60	60	95
Hand 3	Indistinct	Indistinct	73	68	Indistinct	47	81
Hand 5	50	78	65	77	69	62	82
Hand 11	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 13	Indistinct	58	>48	Indistinct	51	Indistinct	94
Hand 19	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	90
Gripping							
Hand 6	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	82
Hand 10	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 16	Indistinct	75	68	59	Indistinct	Indistinct	90
Hand 23	Indistinct	58	75	72	50	45	90
Hand 24	Indistinct	74	76	69	62	45	90
Hand 27	Indistinct	58	61	56	Indistinct	35	85
Ergonomic							
Hand 1	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 9	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 16	Indistinct	75	68	59	Indistinct	Indistinct	90
Hand 18	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 26	Indistinct	Indistinct	Indistinct	Indistinct	52	Indistinct	Indistinct
Right of Fissure							
Hand 8	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 12	Indistinct	71	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 14	Indistinct	Indistinct	44	Indistinct	Indistinct	Indistinct	Indistinct
Hand 16	Indistinct	75	68	59	Indistinct	Indistinct	90
Bordered by Fissures							
Hand 15	Indistinct	Indistinct	>72	74	>58	Indistinct	76
Hand 23	Indistinct	58	75	72	50	45	90
Hand 24	Indistinct	60	Indistinct	65	50	55	89
Within Multiple Fissures							
Hand 4	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 17	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
El Castillo							
No association							

Hand 15	Indistinct	65	85	66	60	35	94
Hand 17	Indistinct	Indistinct	76	80	70	Indistinct	84
Hand 21	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	85
Hand 22	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 23	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 25	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 27	Indistinct	70	80	70	60	40	80
Hand 28	Indistinct	75	80	70	Indistinct	45	85
Hand 31	Indistinct	68	76	Indistinct	63	35	79
Hand 34	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Gripping							
Hand 3	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 4	Indistinct	68	72	65	Indistinct	36	84
Hand 5	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 6	Indistinct	65	70	66	60	35	84
Hand 8	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 32	Indistinct	Indistinct	75	66	50	40	87
Hand 35	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 36	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 38	Indistinct	60	65	55	60	Indistinct	85
Atop Fissure							
Hand 1	Indistinct	75	71	Indistinct	53	25	95
Hand 2	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 3	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 5	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 6	Indistinct	65	70	66	60	35	84
Hand 9	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 10	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 16	Indistinct	Indistinct	Indistinct	60	Indistinct	35	83
Hand 18	Indistinct	70	80	75	70	30	85
Hand 29	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	80
Hand 33	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Spanning Fissure							
Hand 11	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	27	Indistinct
Hand 12	Indistinct	70	66	Indistinct	Indistinct	Indistinct	90
Hand 19	Indistinct	66	Indistinct	67	58	30	Indistinct
Hand 20	55	90	90	80	65	Indistinct	90
Within Multiple Fissures							
Hand 9	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 13	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct
Hand 14	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct	Indistinct

Table 3. Finger lengths, palm widths and angles between thumb and first finger for stencils in La Garma and El Castillo, ordered by apparent association. It will be noticed that most are 'indistinct' i.e. too feint to record measurements with confidence, but these are included here for completeness. Shaded measurements of index fingers indicate hands with finger ratios *consistent* with (but not necessarily indicative of) females; shaded measurements of ring fingers male.

Figure captions

Figure 1. Location map of El Castillo and La Garma.

Figure 2. El Castillo, the Main Panel of hands. Photo Luis Teira and courtesy Gobierno de Cantabria.

Figure 3. La Garma. Recording the morphology of hand stencils. Note the low position of the stencil within a natural alcove. Photo Alfredo Maximiano Castillejo and courtesy Gobierno de Cantabria.

Figure 4. El Castillo. Position of the individual whose hand (Area 3 Hand 28) was stencilled at the extreme right end of the Main Panel of hands. Photo Luis Teira and courtesy Gobierno de Cantabria.

Figure 5. El Castillo, the Main Panel of Hands (our Area 3). Note the need to crouch down to continue below the drop in the ceiling, and the placement of the stencils as if hands were steadying the explorer. Photo Luis Teira and courtesy Gobierno de Cantabria.

Figure 6. El Castillo, Area 1 Hand 1. This stencil was created 'within multiple fissures'. Photo Luis Teira and courtesy Gobierno de Cantabria.

Figure 7. El Castillo, Area 3 Hand 37. This stencil was created in a slight concavity of the rock surface. Photo Luis Teira and courtesy Gobierno de Cantabria.

Figure 8. El Castillo, Gallery of Dots, Hand 38. This isolated stencil was placed over a slight concave depression, with its fingers 'gripping' a slight convex ridge (just visible to the top left of the stencil); the 'fit' of the left side of the stencil to the morphology of the natural crack is remarkable.], as if the crack 'continues' the line of the arm. Photo Luis Teira and courtesy Gobierno de Cantabria.

Figure 9. El Castillo, Area 3, Hands 11 and 12. Two stencils of a right hand, placed either side of a natural crack ('spanning fissure'). Photo Luis Teira and courtesy Gobierno de Cantabria.

Figure 10. Positioning necessary for the creation of the stencils of El Castillo, Area 3, Hands 19 and 20. Photo Luis Teira and courtesy Gobierno de Cantabria.

Figure 1

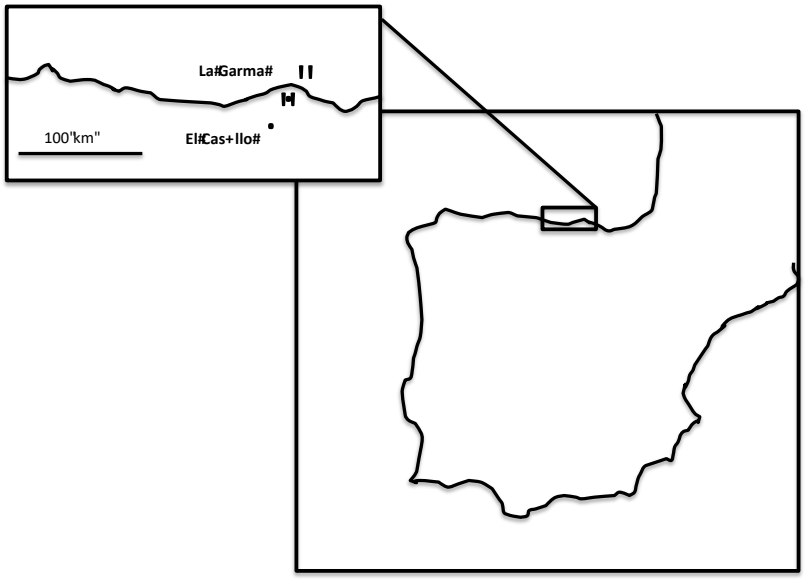

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

Figure 9

Figure 10